

1U CubeSat Lasercom Terminal for Deep Space Communication, Phase I

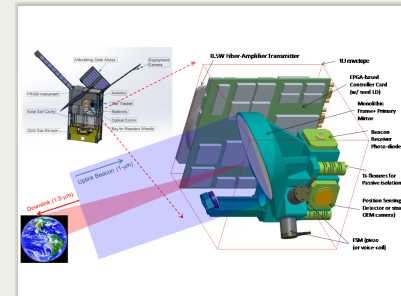
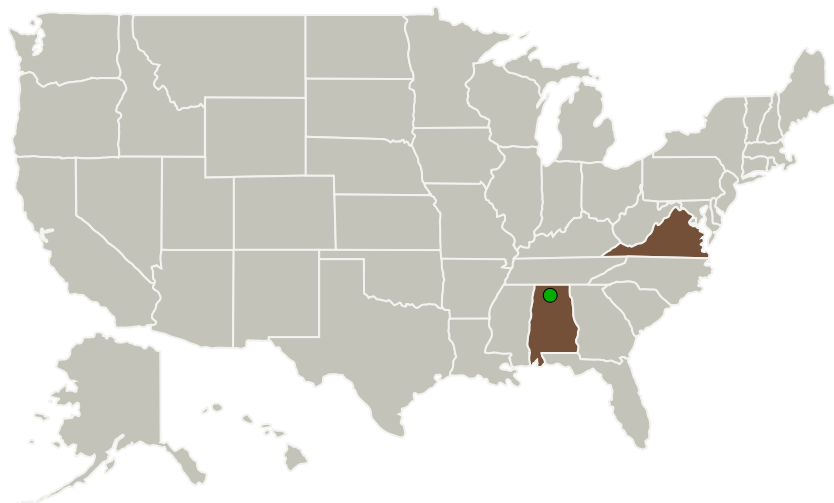
Completed Technology Project (2014 - 2014)



Project Introduction

In this NASA SBIR-select Phase 1 program Fibertek, Inc., proposes the design, optimization, and analysis of a 1U CubeSat Lasercom Optical Terminal, optimized for deep-space colmmunication links, and targeting the following characteristics – (i) Low Size/Weight/Power (SWaP) 1U Lasercom Terminal for deep-space mission (total power budget $P < 5W$ is targeted), (ii) Athermalized optical design of a fiber-coupled optical telescope for lasercom transmit/receive function, (iii) Innovative monolithic design and fabrication of the optical assembly with large 6.5-cm aperture, (iv) Integrated beam point-ahead and beam-pointing stabilization capability, (v) Integrated radiation-tolerant controller card for all control and interface functions for this 1U CubeSat terminal, (vi) Low power radiation-tolerant FPGA based electronics design, for a reconfigurable and highly capable processing platform, and (vii) Use of integrated simulation & modeling tools (optical, thermal, vibration, jitter-control, etc.) for detailed design analysis, and to assist in future hardware-in-the-loop testing of critical functions to validate performance, prior to prototype build and test.

Primary U.S. Work Locations and Key Partners




1U CubeSat Lasercom Terminal for Deep Space Communication Project Image

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Fibertek, Inc.	Lead Organization	Industry	Herndon, Virginia
 Marshall Space Flight Center (MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Alabama	Virginia
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 June 2014: Project Start

 **December 2014:** Closed out

- Final Summary Chart(<https://techport.nasa.gov/file/140618>)

The diagram illustrates the 0.15W Ultra-High-Power Transceiver, a compact satellite component. It features a 3D cutaway view of the device, showing internal components like the PA (Power Amplifier), LNA (Low Noise Amplifier), and various filters. A 2D exploded view of the device is shown to the left, with labels for its various parts: Antenna (with a 100Watt max rating), PA, LNA, Filter, and various connectors (RF, DC, and others). A 3D perspective view of the device is shown to the right, with labels for its various components: PA, LNA, Filter, and various connectors. A 3D perspective view of the device is shown to the right, with labels for its various components: PA, LNA, Filter, and various connectors. A 3D perspective view of the device is shown to the right, with labels for its various components: PA, LNA, Filter, and various connectors.

1U CubeSat Lasercom Terminal for
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Image
(<https://techport.nasa.gov/image/129506>)

Shantanu Gupta

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Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.1 Optical Communications
 - └ TX05.1.1 Detector Development

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System